Btop10 Wireless bluetooth GPS

User Guide

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1. Introduction

1.1 Overview

BTC **Btop10 wireless bluetooth GPS Receiver** is a standalone, high quality GPS receiver, which combines GPS and bluetooth communication technology together. GPS position data could be sent wireless through bluetooth protocol without messy cords or cable. This bluetooth GPS receiver could be put in any place for best satellite signal reception without considering cord issue. Btop10 could meet most general consumer position tracking applications and, furthermore, could meet professional strictly applications such as car navigation and tracking, digital mapping, outdoor surveying, security, agriculture..etc.

Through standard wireless bluetooth communication protocol (serial port profile), It could directly link and communicate with most popular bluetooth enabled electronic devices like PDA/notebook/PC or embedded system, and then becomes a low cost and high quality GPS system with best portability.

With built in high capacity li-ion battery, patch antenna and compacted size, light weight, Btop10 is easily portable and can operate independently long period of time without any external power source

Note:

1. When using the receiver, it is better to put GPS in the environment of clear view of sky in order to receive correctly satellite signals.

1.2 Features

TheBTop10 provides great features as below.

1. Track up to 12 satellites with first fast fix and low power consumption.
2. SiRF Star II low power chipset
3. Differential capability utilizes real-time RTCM corrections producing 1-5 meter position accuracy.
4. Compact size and light weight for best portability
5. RF connector(mmcx) for external antenna
6. Bulit in high capacity rechargeable battery and patch antenna keep device operate about 8.5~9 hours
7. Support bluetooth serial port profile 1.1, class 2 protocol (SSP)
8. Support NMEA 0183 format with 38400bps baud rate (default)
9. FLASH memory inside for program upgradeable
10. Three LED display GPS, bluetooth and battery status

1.3 Technology specifications

1.3.1 Physical Dimension

Size:	103 (W) x 61 (D) x 29 (H) (mm)	
Weight:	100g (with battery)	
RF connector:	mmcx	(external antenna is optional)

1.3.2 Environmental Characteristics

1. Operating temperature: $-10^{o}C$ to $+60^{o}C$
2. Storage temperature: $-20^{o}C$ to $+60^{o}C$
3. battery charging temperature: $0^{o}C$ to $+40^{o}C$
4. Humidity range: 5%~95% no condensing

1.3.3 Power Characteristics

1. Input voltage: 5VDC
2. Battery: Rechargeable Lithium-ion cell battery(1000mA) with 5VDC battery charging circuit

3. operate time: 8.5~9 hours at battery full charge condition

CAUTION:

1. Due to this GPS built-in lithium-ion battery, so Do not expose GPS and battery to temperature above 60°C. Do not disassemble or mistreal this GPS and battery.
2. Failure to follow these instructions may present risk of explosion, fire, or high temperature

1.3.4 Datum

Default: WGS-84
Other: selectable for other datum (refer to appendix A)

1.3.5 GPS Performance

1. Tracks up to 12 satellites.
2. Update rate: 1 second.
3. Acquisition time
   - Reacquisition 0.1 sec., averaged
   - Hot start 8 sec., averaged
   - Warm start 38 sec., averaged
   - Cold start 45 sec., averaged
4. Position accuracy:

A) Non DGPS (Differential GPS)
- Position 5-25 meter CEP without SA
- Velocity 0.1 meters/second, without SA
- Time 1 microsecond synchronized GPS time

B) DGPS (Differential GPS)
- Position 1 to 5 meter, typical
- Velocity 0.05 meters/second, typical

C) EGNOS/WAAS/Beacon
- Position < 2.2 meters, horizontal 95% of time
  < 5 meters, vertical 95% of time

5. Dynamic Conditions:

Altitude	18,000 meters (60,000 feet) max
Velocity	515 meters / second (1000 knots) max
Acceleration	4 G, max
Jerk	20 meters/second, max

1.3.6 Wireless specifications

- compatible with bluetooth 1.1 serial port profile(SSP)
- transmitter power: class 2
- transmission range: up to 10 meters
- frequency range: 2402mhz ~ 2480mhz
- hopping channel: 79
- modulation: GFSK
- receiver sensitivity: -85dbm

1.3.7 Interfaces

- Connection: bluetooth 1.1 serial port profile(SSP)
- Protocol: NMEA 0183 format (default), and Sirf Binary format (GPGGA, GPGSA, GPGSV, GPRMC)
- baud rate: 38400, N,8,1 (default)

2. Hardware description

2.1 LED

: indicate GPS status

: indicate battery status

: indicate wireless bluetooth status

There are three LEDs to show different status:

1. Battery LED:
   - **RED color** indicate battery low
   - **ORANGE color** indicate battery is charging
   - **GREEN color** indicate battery is full or still have enough power.

2. **GPS LED(green):**
   - ACTIVE indicate GPS power on
   - BLINKING per second indicate position have been fixed

3. **Bluetooth LED(blue):**
   - FAST BLINKING indicate this Bluetooth GPS is at PAIRING state waiting for being discovered and paired by other bluetooth enabled device like PDA

NOTE:

1. Every time users start to connect BTC bluetooth GPS with any new MASTER bluetooth device, which never pair mutually before, users have to push pairing switch first (bluetooth LED will blink quickly), then enable master bluetooth device "search bluetooth device" function, master bluetooth device will take few seconds to find GPS and ask for keying pass key.
   After enter valid PASS KEY, connection will be setup (please refer to bluetooth PDA or other master bluetooth device for details)

2. PASS KEY (or PIN CODE) for BTC GPS is "0000"

- SLOW BLINKING indicate GPS is waiting for connection from other master bluetooth device

- ACTIVE indicate bluetooth connection have been established successfully

2.2 Switch

1. power slide switch — **O**: power off; **I** : power on

2. Link tact switch: push this LINK switch slightly will enable bluetooth PAIRING function(bluetooth LED will blink quickly)

NOTE:
1. Linking need to be done one time only when users use GPS and connect with PDA..etc device in first time
2. Unless users have another PDA or Bluetooth enable device for BTC GPS, other wise users don't need to push this switch

WARNING:
1. Linking switch may not be activated by all bluetooth connection condition, please turn off power first, and then
push slightly Paring switch again if any problem to this issue.

3. DC5V: plug with car charger or travel charger to charge battery
(input: DC 5V, 500mA)

2.3 RF Connector

Built in MMCX RF connector (external active antenna is optional)

WARNING:
1. Due to the size of the MMCX RF connector is quite compacted, so please
use BTC external active antenna with MMCX plug, or other external antenna which have been approved by BTC.

3. Quick start

First step: **charging battery more than 5 hours**
Before using bluetooth GPS receiver, battery have to be charged first,
Connect travel charger or car charger with GPS receiver DC5V Jack.
Charging the battery until the battery LED from orange color becomes Green color.

Second step: **turn on GPS receiver , then wait for bluetooth connection and position to be fixed**

LED will show below status

- The **GPS LED (green)**, will be active, and will blink slowly per second later if the position has been fixed
- The battery LED should be Green
  Red color will show up if battery is low, the color will become orange while charging
- **Bluetooth LED(blue)** will blink quickly (waiting for pairing from other bluetooth device) if it is used first time or LINK switch have been activated by users
- Bluetooth LED will blink slowly (waiting for connection from other bluetooth device) if Pairing have been done before

Third step: **enable PDA bluetooth function**

Activate bluetooth search and connect function of bluetooth PDA or dongle. a virtual comport will be assigned after bluetooth connection is successful
(refer to instructions from bluetooth enable PDA which you select)

NOTE:
a PASS KEY (or PIN code) request will prompt for linking from PDA, please enter "0000"

4TH step: **Running GPS navigation software**

Verify and select bluetooth virtual comport with default baudrate 38400 for navigation software, then start to run NAVIGATION software

NOTE:
Make sure the comport number of software is the same as bluetooth virtual com port no

NOTE:
LINK button ofBTop10 have to be activated whenever a new bluetooth PDA available for connection

4. how to activate bluetooth enabled device

There are many bluetooth enable devices like PDA or bluetooth dongle on the market which direct connect with BTC GPS. Each one may have different bluetooth setup procedure. **So refer to their user manual for detailed instruction.**

4.1 bluetooth PDA

Below is a briefing and sample for bluetooth PDA (Ipaq3970 series), other bluetooth PDA device should have similar concept

1. **Turn on BTCBTop10 GPS first**
2. **Click bluetooth sign on the right lower corner of PDA**
3. **turn radio on if it is off**
4. **enter bluetooth manager**
5. **click "search" to start finding bluetooth device in range**
   device name of " BTC BTop10" will be listed after this searching process. If not, repeat search again. Once BTC GPS have been found and recognized, then ready to connect.
6. **Save BTC GPS device and group information into WINCE system**
7. **double click "BTC BT-GPS" icon to start connection**

8 **Running navigation software and select correct virtual com port with 38,400 buad rate**

Note:

- BTC BT GPS PIN code is “0000”
- Make sure the com port number in your navigation software is the same as the bluetooth virtual com port
- User can get bluetooth virtual com port no by checking the number of output com port in serial port panel of bluetooth
- Normally, iPAQ 3970 output com port is 8

4.2 bluetooth Dongle(usb type)

Below is a briefing and sample for bluetooth dongle (BU5000), other bluetooth dongle should have similar concept

1 **Turn on BTCBTop10 GPS first**

2 **Click bluetooth sign on the right bottom corner of windows**

3 **Double click the bluetooth icon**
dognle will start searching for any bluetooth device in range, a icon of “BTC BTop10” will show up after searching end.

4 **Double click the “BTC Btop10” icon,**
a icon of “SPP slave” will show up

5 **Double click the “SPP slave” icon**
dongle will start connecting.
A passkey request will be prompted for new device pairing, please enter passkey “0000”, or a successful connection Message box will show up(SPP slave icon become green from gray)

6 **Running navigation software and select correct virtual com port with 38,400 baud rate**

Note:

- BTC BT GPS PIN code/passkey is “0000”
- Make sure the com port number in your navigation software is the same as the bluetooth virtual com port
- User can get bluetooth virtual com port no as below:
  a. right click icon “SPP slave”, select “status”
  b. click “properties”
  the number in the port box is virtual com port

APPENDIX A

Earth Datum

Item	Datum	Reference Ellipsoid	Data name
1	Adindan - Ethiopia	Clarke 1880	Data1.dat

2	Afgooye – Somalia	Krassovsky	Data2.dat
3	Alaska, Conus – North American 1983	GRS 1980	Data3.dat
4	Albania – S-42 (Pulkovo 1942)	Krassovsky 1940	Data63.dat
5	Argentina	South American 1969	Data4.dat
6	Australia	Australian – National	Data70.dat
7	Bahrain – Ain el ABD 1970	International	Data5.dat
8	Bangladesh	Everest 1830	Data6.dat
9	Bolivia	South American 1969	Data8.dat
10	Botswana – ARC 1950	Clarke 1880	Data7.dat
11	Brazil	South American 1969	Data9.dat
12	Brunel, East Malaysia	Everest (Sabah & Sarawak)	Data37.dat
13	Canada – North American 1983	GRS 1980	Data10.dat
14	Chile	South American 1969	Data13.dat
15	Colombia	South American 1969	Data12.dat
16	Colombia – Provisional American 1956	International	Data11.dat
17	Czechoslovakia – S-42 (Pulkovo 1942)	Krassovsky 1940	Data64.dat
18	Ecuador	South American 1969	Data14.dat
19	European 1950 – Central Regional Mean	International	Data29.dat
20	European 1950 – Cyprus	International	Data15.dat
21	European 1950 – Eastern Regional Mean	International	Data16.dat
22	European 1950 – Egypt	International	Data17.dat
23	European 1950 – Finland, Norway	International	Data18.dat
24	European 1950 – Greece	International	Data19.dat
25	European 1950 – Iran	International	Data20.dat
26	European 1950 – Italy (Sardinia)	International	Data21.dat
27	European 1950 – Italy (Sicily)	International	Data22.dat
28	European 1950 – Malta	International	Data23.dat
29	European 1950 – Northern Regional Mean	International	Data24.dat
30	European 1950 – Portugal, Spain	International	Data25.dat
31	European 1950 – Southern Regional Mean	International	Data26.dat
32	European 1950 – Tunisia	International	Data27.dat
33	European 1950 – Western Regional mean	International	Data28.dat
34	Guyana - South American 1969	South American 1969	Data30.dat
35	Hawaii-North American 1983	GRS1980	Data32.dat
36	Hong Kong	International	Data31.dat
37	Hu_Tsu_Shan Taiwan	International	Data33.dat
38	Hungary – S-42 (Pulkovo 1942)	Krassovsky 1940	Data65.dat
39	Indian 1960	Everest 1830	Data34.dat
40	Ireland - 1965	Modified Airy	Data35.dat
41	Kazakhstan – S-42 (Pulkovo 1942)	Krassovsky 1940	Data65.dat
42	Kenya, Tanzania- ARC 1960	Clarke 1880	Data53.dat
43	Latvia – S-42 (Pulkovo 1942)	Krassovsky 1940	Data67.dat
44	Liberia – 1964	Clarke 1880	Data36.dat
45	Mexico, central America	GRS1980	Data38.dat
46	OMAN	Clarke 1880	Data39.dat
47	Pakistan	Everest 1830	Data40.dat
48	Paraguay - South American 1969	South American 1969	Data42.dat
49	Peru1 – South American 1969	South American 1969	Data41.dat
50	Philippines	Clarke 1866	Data43.dat
51	Poland – S-42 (Pulkovo 1942)	Krassovsky 1940	Data68.dat
52	Potsdam	Bessel 1841	Data71.dat
53	Puerto Rico – Virgin Islands	Clarke 1866	Data44.dat
54	Qatar national	International	Data45.dat
55	Qornoq – Greenland (SOUTH)	International	Data46.dat
56	Regional Mean	South American 1969	Data48.dat
57	Reunion – Mascarene Islands	International	Data47.dat
58	Romania – S-42 (Pulkovo 1942)	Krassovsky 1940	Data69.dat
59	Rome 1940 – Italy	International	Data49.dat
60	Saudi Arabia – Ain el Abd 1970	International	Data50.dat
61	Singapore	Modified Fischer 1960	Data51.dat
62	South Africa	Clarke 1880	Data52.dat
63	Thailand 1975	Everest 1830	Data54.dat

64	Tokyo_Japan	Bessel 1841	Data60.dat
65	Tokyo_Korea	Bessel 1841	Data61.dat
66	Tokyo_Mean	Bessel 1841	Data59.dat
67	Tokyo_Okinawa	Bessel 1841	Data62.dat
68	Trinidad, Tobago	South American 1969	Data55.dat
69	Venezuela	South American 1969	Data57.dat
70	Venezuela – Provisional American 1956	International	Data56.dat
71	WGS84	WGS84	Data58.dat